Taking Notes on Informational Source Text Using Text Structures: An Intervention for Fourth Grade Students with Learning Difficulties

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Abstract

Students with writing difficulties may have difficulty when writing informational text with source material due to a) inexperience with such text and b) difficulties reading and understanding source material. Teaching students to take notes related to informational text using text structures (e.g., description, compare/contrast) may help them access source text and improve planning and organization of their ideas. Two pilot studies examining the usability, feasibility and promise of a note-taking and text structure intervention are presented in this manuscript. In study 1, the researchers employed a multiple-probe design across three 4th grade participants with reading difficulties. In study 2, the researchers employed an underpowered experimental design, comparing the intervention to a narrative-based reading and writing strategies. Fidelity of implementation was acceptable to high in both studies, indicating preservice teachers find it useable and it is feasible to implement the lessons within the 30-minute time frame. However, there were mixed results of the intervention on note-taking outcomes. In study 1, a functional relation was demonstrated for two of three participants for the note-taking measure. In study 2, the intervention group did not statistically outperform the control group on the note-taking measure, but there was a non-significant effect size of 0.75 between the groups. The findings, though mixed, warrant further study of the intervention in a fully powered study. Results on reading outcomes for both studies are also discussed.

Writing is a complex task that is shaped and constrained by the cognitive resources of a student and the community in which the writing task takes place (Graham, 2018). It takes place in a social environment, often with multiple collaborators, which for students means teachers, parents, and peers. It involves interactions between aspects of the environment (e.g., topic, audience), components of the writing process (e.g., planning, organizing, revising), and the writer's long-term memory (Flower and Hayes, 1981). Moreover, the cognitive process and community interactions involved in writing may be constrained by a writer's working memory capacity (Berninger & Amtmann, 2003; Hayes, 1996). Students who struggle with writing have difficulty with one or more of these processes.

The writing difficulties faced by struggling writers may be especially pronounced when they are asked to write informational text (Hebert, in press). Students come to school with less experience with informational text than narrative text (Williams & Pao, 2011; Hebert, Bohaty, Nelson, & Lambert, 2018), and suffer a lack of exposure to expository text in primary grades (Duke, 2000). Because of this, struggling writers may not understand the differences between narrative and informational text, such as differences in text structure and density of facts. The abstract concepts, difficult vocabulary, and unfamiliar content that are often present in this genre (Anderson & Nagy, 1991; Snow, 2002) may also make it challenging for struggling students to access. In other words, these students often lack the background knowledge necessary to write informational text. Moreover, few writing interventions exist to teach struggling writers how to develop background knowledge and write informational text.

One way to address this is to provide students with source material that can be used to gather information prior to writing, as well as a strategy for using the information gathered. Teachers may instruct students to read source material, identify and paraphrase important

information, and reorganize that information for use in their own writing (Hebert, in press). However, students with writing difficulties also often have reading difficulties (Hebert, Kearns, Hayes, Bazis, & Cooper, under review) and may oversimplify or misunderstand source text, have difficulty identifying main ideas, or have difficulty evaluating ideas in the source material (Hayes, 1996). Therefore, these students need strategies for accessing informational text, identifying important information in the text, and taking notes that they can use when writing their own text.

Teaching Students to Take Notes on Sources Using Informational Text Structures

Informational text is often organized using combinations of five text structures identified by Meyer (1975, 1985). These include *description*, *compare/contrast*, *sequence*, *problem/solution*, and *cause/effect*. Instruction of these text structures has been shown to be effective for improving reading comprehension outcomes for students with reading difficulties (Englert & Hiebert, 1984; Hebert, Bohaty, Nelson, & Brown, 2016; McGee, 1982; Meyer, Brandt, & Bluth, 1980; Ray & Meyer, 2011; Taylor, 1980). Therefore, taking notes on information related to these structures may also be effective for preparing students to write informational text. For example, taking notes on a similarities and differences in source material can help students organize and write their own text comparing and contrasting two things or ideas.

Several note-taking strategies have been identified as effective for improving note-taking skills and reading comprehension, including strategies using graphic organizers (e.g., Chang, Chen, & Sung, 2002), outlining (e.g., Bigelow, 1992), and Cornell Notes (e.g., Faber, Morris, & Lieberman, 2000). However, these strategies do not always lend themselves to preparing students to reorganize and write their own informational text, and while some have been

developed for use with informational text structures (i.e., graphic organizers), these may be difficult for students to recreate when taking notes on their own.

Information Frames

To address this, the first, second, and third authors developed an intervention to teach students to take notes on information related to the text structure using *information frames*. The *information frames* were developed to be easy to remember and recreate on note-book paper. The frames for each of the text structures are different, but include similar features, including places to take notes on the text structure, the topic, and general ideas. Additionally, each information frame also space for specific information related to the text structure. For example, students are prompted to include information about characteristics and facts for simple descriptions, similarities and differences for compare and contrast passages, and events for sequence passages. See Figure 1 for an example of an information frame.

The information frames are similar to graphic organizers, but were designed to be more user friendly for struggling readers and writers in three ways. One, they are rectangular and use standard lines, making them easier for students to recreate on notebook paper. Two, all of the frames have the same basic structure, requiring the student to take notes on the "Structure" and "Topic" on the first line, specific text structure information on the lines below the structure, and additional notes in lines below the text structure information. The consistency in the frames was designed to facilitate memory of the note-taking procedure, while highlighting differences in the type of structure information to include. Three, the simple lined format of the information frames ensured that information was presented and read from left to right and top to bottom, consistent with English; this is not always the case in graphic organizers, which may ask students

to include the topic in the center of a groups of ideas or include one type of information sandwiched between a different type of information, such as in a Venn diagram.

Purpose of the Current Study

Lessons teaching students to use information frames to take notes on informational text were developed as one module of a multi-component informational text writing intervention: *Structures Writing*. The purpose of the current studies was to examine the note-taking module of the intervention apart from the writing module, to determine the promise of this component. Two pilot studies are presented in this manuscript. Both studies examined the feasibility, usability, and promise of the note-taking module of the intervention. The note-taking module is used to teach students how to take notes from informational source text using text structures to organize the notes. Note-taking skills may be vital for helping students as they plan and organize information before writing expository text. The *Structures Writing* intervention was designed to scaffold the development of these skills for students at-risk for writing difficulties. Because the intervention was still in the development phase during these studies, the pilot studies were conducted on a small scale. The primary research questions centered around implementation of the intervention, while the secondary questions examined promise of the intervention for improving student performance. The specific research questions, method, and results are presented for each study, followed by a discussion synthesizing the results and implications of both studies.

In addition to examining the promise of the intervention for teaching note-taking skills, the studies also include reading outcome measures. As previously stated, note-taking has been shown to improve reading outcomes (see Graham & Hebert, 2011). Therefore, we hypothesized that taking notes on informational text using informational frames may similarly impact reading

comprehension. Reading comprehension was measured in multiple ways across studies, including through identification and discrimination of text structures, oral retells, and multiple-choice questions.

Pilot Study 1: Multiple-Probe Design

Study 1 examined *Module 2 (Note-taking)* using a single-subject design with the following research questions:

1. Is it feasible for a preservice teacher to deliver instruction with fidelity and within a 25- to 30-minute time-frame for each lesson?
2. Is there a functional relation between the instruction and participants' performance on measures of note-taking?
3. Do effects of note-taking impact students' ability to provide an oral retell of the passage?

Method

The researchers employed a multiple-probe design, with the start of instruction staggered across participants. During baseline, participants took notes on passages to establish typical note-taking performance. When instruction was started for the first participant, we continued to collect probes for students who remained in baseline. If a student's performance on the note-taking outcome showed a change in level from baseline to posttest, and the baseline performance of the next participant was stable, the next participant began instruction. A "black-box" was used for instruction in the graphs, to illustrate that there was no data taken during instruction. This was done for two reasons. First, we anticipated that students would learn this complex task in a single instructional session, especially given the introduction and modeling in the first lessons. Therefore, data was not collected until after the student received all of the instructional lessons. Second, although less important than the design factor, session time was also an issue.

Student's only attended the sessions for 30 minutes, making it impossible to include instruction and probes within the same session.

Research Setting. This study was conducted at a university reading center in the plains region of the United States. University pre-service teachers at the reading center provided reading and writing instruction to struggling elementary and middle school readers.

The reading center provides tutoring during fall, spring, and summer sessions. This study was conducted during the summer session. Therefore, children were on summer break. One-to-one tutoring was provided by university students majoring in elementary education and special education. Instruction in the tutoring sessions focused on the areas of the students' greatest needs, but generally included instruction on reading fluency, decoding skills, comprehension strategies, and narrative or persuasive writing strategies.

For the current study, participants received their typical instruction at the reading center, and then remained at the center afterward to complete probes and receive instruction in the research study. Instruction took place in a small, quiet conference room at the reading center. The reading center provided materials and space, as well as scores from reading assessments used to screen the participants. However, the researchers conducted the intervention conducted separately from all reading center activities.

Participants. Participants qualified for this study based on two criteria. First, participants received tutoring at a reading center during the summer (the reading center accepted students who were at-least one grade-level behind in one or more aspects of reading development). Second, students completed fourth grade and would be entering fifth grade in the fall.

Regarding the first inclusion criterion, all children receiving tutoring at the Reading Center completed screening measures before being accepted into the tutoring program. Assessments used in screening were the Test of Silent Reading Efficiency and Comprehension (TOSREC) and the Word Identification and Word Attack subtests of the Woodcock Reading Mastery Test-Revised (WRMT-R). Students qualified for tutoring at the reading center if they scored at or below the 25th percentile on the TOSREC, or one grade level or more behind their age equivalent on the WRMT-R. Researchers contacted the families of students for participation in this research study if they met this criterion and completed fourth grade.

Three participants qualified for this study. All participants were Caucasian. Two were boys and one was a girl. Two of the three participants received special education services with goals for reading. Pseudonyms were chosen by each of the participants.

Peyton was a 10-year-old male. The reading center reported he was reading at a Developmental Reading Level (DRA) of 28. Peyton scored in the less than 1st percentile on the Test of Silent Reading Efficiency and Comprehension (TOSREC). His Woodcock Reading MssterWRMT-R word identification score was at the 18th percentile, and his WRMT-R word attack score was at the 8th percentile. Peyton received special education services with goals in reading fluency, reading comprehension, and writing.

Bob was a 10-year-old male. His reading level was a DRA level 30. Bob's TOSREC score was at the 32nd percentile. His WRMT-R word identification score was at the 40th percentile, and his WRMT-R word attack score was at the 32nd percentile. Bob did not receive special education services.

Abby was a 10-year-old female. Her TOSREC score was at the 13th percentile. Abby's WRMT-R word identification score was at the 29th percentile, and her WRMT-R word attack

score was at the 30th percentile. Abby received special education services with goals in reading fluency and reading comprehension.

Procedures. A staff member contacted the parents of all fourth-grade students at the reading center to inform them of the study and invite them to an informational session with the first author. At the informational session, the first author provided parents with information about the eligibility requirements and study procedures, and reviewed the informed consent procedures. To determine eligibility, study personnel then reviewed the reading center screening measures scores (i.e., WRMT-R word identification and word attack subtests; TOSREC scores) of students with consenting parents. Eligible children were then given the opportunity to assent to participate in the study. Participants completed baseline measures, the instructional phase, and post-instructional measures.

Baseline phase. During baseline, each participant completed at least three probes in which they read three-paragraph passages. They were told they could read the passage as many times as they liked and take notes if they chose, and that they would be asked to tell everything they remembered from the passage when they were finished. Researchers provided children with blank paper and a pencil to take notes with. Each passage included three-paragraphs, with each paragraph representing one of three text structures, in no particular order: simple description, compare/contrast, and sequence.

Once the first participant began instruction, an additional baseline probe was given to the two other participants. This was done to ensure that the participants that were not yet in the instruction phase maintained a stable baseline and had not improved before instruction, to control for potential history or maturation effects. It was particularly important to control for these threats to validity, given the participants were also receiving instruction at the reading center.

Instruction. During the instruction phase, a research assistant taught the participants to take notes in 7 lessons. Each lesson was designed to teach students how to take notes on expository text passages using text structures identified by Meyer and colleagues (1985). Due to time constraints, this study focused on only three of the five text structures: simple description, sequence, and compare/contrast. Teachers taught the students to take notes using 'information frames" developed for the intervention to take notes on information specific to the text structure used by the author, rather than simply the main idea and details.

Each lesson followed the same gradual release instructional format: 1) developing background knowledge, 2) teacher modeling, 3) guided practice, and 4) independent practice. To develop background knowledge, the teacher introduced the concept of text structures and provided an example passage for each structure. The teacher then modeled how to discriminate among the three text structures, by reading a new passage and providing a think-aloud to identify the text structure features. This was provided as an overview and an introduction to the different types of information included for each structure. In subsequent lessons, the teacher continued to develop background knowledge by providing a review of the information learned in the previous lesson, as well as an overview of the information to be learned in the current lesson.

During modeling, the teacher showed the student how to take notes with an information frame using a four-step process. First, the teacher read passages aloud. The passages used for the lessons ranged in Lexile Levels from 410L to 810L to help ensure students could access the information. Second, the teacher identified and wrote down the topic of the paragraph. Third, the teacher identified and wrote down key information about the topic in the paragraph. Fourth, the teacher wrote down any extra information or notes provided in the paragraph that was not directly related to the topic (Note: not every passage contained extra information, so the teacher

modeled making decisions to include notes in this section for modeled passages in the think-aloud).

During guided practice, the teacher read passages aloud to the participants and prompted them to fill in information frames. First, the teacher read the passages aloud. Second, the teacher asked the participant to identify the topic of the paragraph. The participant wrote the topic in the frame. Third, the teacher and the participant shared the responsibility of identifying key information about the topic and the participant wrote the key information in the frame. Fourth, the teacher and participant decided whether there was any additional key information they wanted to include in the general notes section.

During independent practice, the teacher read the paragraph aloud to the participant. The participant then independently identified and wrote down the topic, key information, and notes in the paragraph. The teacher checked the participant's work when completed.

Post instruction. After one participant completed the instruction phase, three post-instruction probes were given to that participant in three successive sessions. The post-instruction probes were administered the same way that baseline probes were administered. When the second participant completed instruction, the first participant received an additional post-instruction probe. When the third participant completed instruction, the first and second participants also received a probe. This was done to determine whether the skill was maintained. Maintenance probes were not given to the third participant due to time constraints.

Dependent Measures

During the baseline and post-instructional phases, the participants were given a three-paragraph passage to read. Each paragraph of the passage represented one of the three text structures taught in the program (simple description, compare/contrast, and sequence). The

passages ranged in length from 189 to 210 words, and had a range of 17 to 20 sentences. Overall Lexile levels of the passages ranged from 720L to 760L (Lexile levels of the individual paragraphs ranged from 570L to 820L). To control for passage effects, the researchers randomly assigned a different passage order for each participant. The researchers informed participants they could read the passage as many times as they wanted and take notes on the passage, and that they would be asked to retell everything they remembered from the text when they were ready.

The dependent measures included the participants' (a) *note-taking* and (b) *oral retell*. The note-taking measure assessed the participants' ability to take notes on expository text passages, and was used as the primary dependent measure for making decisions about phase changes in the study (i.e., baseline to instruction). The oral retell measure assessed participants' comprehension of the passages afterward, to determine if they remembered more as a result of taking notes. The two measures are explained in more detail below.

Note-taking. A research assistant gave the participant directions for the task and provided participants with an opportunity to ask questions regarding how to complete the task. The participant was then given the passage to read and blank notebook paper to take notes. When the participant was finished reading and taking notes, the passage and notes were taken from the participant by the project staff member and the notes were scored at a later time.

Participants' notes were scored three ways: 1) Total number of words, 2) Number of idea units (the number of unique ideas, regardless of the number of words used), and 3) Percentage of text structure information included.

Total number of words in the notes. The first way notes were scored was by the number of words written. Points were given for each word written, regardless of spelling or grammatical

correctness. Project staff counted the number of words that written by the participant for each set of notes.

Notes including main ideas and details. Second, notes were scored was by assessing whether the participant included any of the idea units of each paragraph in their notes. Members of the project staff created score sheets containing idea units (see Figure 2 for an example score sheet). Each idea unit represented the main ideas or details written in the passage. To determine idea units, three project staff members created drafts of Idea Units score sheets for each of the passages. Each fact represented in the passage corresponded to one idea unit on the score sheets. The project staff then discussed disagreements on idea units and collaboratively revised the score sheets to create final versions.

Scorers compared the scoring sheet to the participants' notes. Each main idea and detail included in the notes received a score of one point. The researchers then calculated the total number of idea units.

Notes related to text structure. The researchers used this score to determine phase-changes from baseline to instruction. First, the researchers scored the participant notes paragraph-by-paragraph based on the text structure used in each paragraph. Scorers assigned points if the notes included the topic of the paragraph, and the appropriate information about the information related to the text structure (i.e., important facts, similarities and differences, or events).

Project staff developed the rubrics for this scoring measure for each passage used in the study. Three of the members of the project staff created drafts of completed information frames for each of the passages. The information frames were designed to mirror the frames participants would learn to use during instruction. The project staff then discussed any differences, and

collaboratively revised the frames. Final frames were created and used to score participant notes. Participants' notes were scored by comparing the notes to the frames. Because the number of structural elements differed across structures and passages, the researchers calculated the percentage to structural elements included for each passage (see Figure 3 for an example of the scoring rubric alongside the corresponding reading passage).

To determine inter-scorer agreement, two project staff members scored 100% of the notes. Point-by-point agreement for each part of the information frame was scored. Inter-scorer agreement was calculated by dividing the number of agreements by the total number of possible agreements and multiplying by 100. Inter-scorer agreement for the notes measure was 97.1%.

Oral Retell. After the participant finished reading the passage and taking notes, they were asked to retell everything they could remember about the passage. The participant's oral retell was audio-recorded and scored. The Oral Retell measure was an untimed, individually administered measure composed of a three-paragraph passage. Each paragraph of the passage represented a single text structure (simple description, compare/contrast, and sequence). Each passage contained all three text structures that were taught to the participants. The Oral Retell was designed to assess participants' comprehension of expository text. Researchers gave participants a passage to read and take notes on if they wished, then were asked to recall everything they could about the passage without referencing the passage or any notes they took.

Similar to procedures used by Hammann & Stevens (2003), participant responses were scored based on the total number of idea units they could recall. An idea unit consisted of a single fact represented in the passage (e.g., windmills are used to pump water). The researchers used the same Idea Units Score Sheets to score the Oral Retells that were used to score notes. The retells were scored by two project staff members using the final versions of the score sheets.

Differences in scoring were discussed and resolved. The agreed-upon score was used for final data. The passages had a range from 26 to 37 idea units. Therefore, scores were converted to percentages of total idea units to ensure the scores were comparable across passages.

The oral retell measure was administered by project staff in a quiet, distraction-free room, one participant at a time. First, directions were given to the participants for completing the oral retell measure and allowed participants to ask questions regarding how to complete the task. Second, participants read the passage given to them silently. They were also able to take notes over the passage at this time. Third, participants turned over the passage and their notes and retold everything they could remember. The project staff member audio-recorded the retells. When the participant indicated that they were finished or they couldn't remember anything else about the passage, they were given an additional 30 seconds to think. After 30 seconds, the project staff member prompted them and asked to say more. This was repeated until the participant could not remember anything else. The project staff member asked one final time if there was anything else, waited 30 additional seconds for the participant to respond, then completed the retell. Time for participants to complete the oral retell measure ranged from approximately five to ten minutes.

To determine inter-scorer agreement, two project staff members scored 100% of the oral retells. Point-by-point agreement for each idea unit was scored. Inter-scorer agreement was calculated by dividing the number of agreements by the total number of possible agreements and multiplying by 100. Inter-scorer agreement for the oral retell measure was 96.33%.

Fidelity of Implementation. Fidelity forms were developed for all lessons. The forms included a checklist of the elements for each lesson. The fidelity observer made binary choices, indicating 1 if the element was observed, or 0 if it was not observed.

Results

Fidelity of implementation was acceptable overall, as an average 91% of lesson elements were covered across lessons. Individual lessons had lower than acceptable fidelity (less than 85% of lesson elements completed; see Table 1 for Fidelity by lesson). This was not a product of tutors forgetting to include components. Rather, there were too many exercises in some of the lessons for slower working students to complete. Therefore, the tutor could not always complete all of the components within the allotted 30-minute time-frame. It should be noted that the participants worked faster as they learned the strategy across lessons, so this was more of a problem in early lessons. It is also important to note is that the number of elements included for the first lesson increased sequentially for the three participants, and for lessons two and three for the third participant. This indicates that the instructor was able to include more components in the lessons after gaining experience with the intervention. However, some of the lesson components may need to be revised by the researchers to streamline the lesson implementation.

The researchers scored students' note-taking in three ways: Number of words, number of idea units, and percentage of text structure elements in the text that were noted by the students. Table 2 shows the mean scores for each student at baseline, post-instruction, and maintenance.

Note-Taking. Figure 4 shows the graphs for number of words in students' notes. Baseline performance was stable and low for all participants. Peyton consistently took notes during baseline, but never wrote more than 11 words. Bob never took notes, and Abby only took notes on one of her six baseline points, writing five total words. Based on visual analysis of the number of words written at posttest, each of the students showed a dramatic increase in level, and a functional relation was demonstrated for two of the participants. The baseline performance of the Bob and Abby was stable following instruction for Peyton, and Abby's baseline remained

stable following instruction for Bob. However, Bob only demonstrated an increase in words written for two of three posttest data points; for one probe, Bob wrote zero words (it should be noted that this was July 3rd and Bob indicated he was unhappy and his family was doing summer activities that he wanted to join). Due to time constraints, maintenance data was taken only for Peyton (two probes) and Bob (one probe), with mixed results. Peyton did not maintain his note-taking for the maintenance probe taken six sessions following the final posttest probe, but performed higher than two of his posttest probes for the maintenance probe taken 13 sessions following the final posttest probe. Bob wrote more words in his maintenance probe notes than in baseline or his July 3rd posttest probe.

While number of words provides a sense of the amount of writing, students may deem it necessary to only use a single word to capture and remember select ideas. Therefore, we measured the number of idea units represented in the notes. Figure 5 shows the graphs for number of idea units recorded for each probe. Because students wrote few words during baseline, the number of idea units represented was also stable and low. Similar to the number of words, a functional relation was demonstrated for two students, but Bob did not take notes during his July 3rd posttest probe. However, Peyton and Bob both took notes on more idea units during maintenance probes than during baseline.

This intervention was primarily aimed at teaching students to take notes on information related to the elements of the text structure used by the author for each paragraph of the reading passage. Figure 6 shows the percentage of ideas related to the text structure elements in the passage (as identified by the researchers). Similar effects are shown to the other note-taking measures. However, Peyton did not maintain performance on this measure of his notes,

indicating that while he did continue to take notes, the notes did not represent the information related to the text structures in the passage.

Oral Retell. Because the note-taking measure was used at the primary measure for determining phase changes, the oral retell was used as the secondary measure. Therefore, the oral retell data were graphed, but stability in baseline was not required for phase changes. Figure 7 shows the graph representing the number of idea units in the oral retells after taking notes on the passage. Although the mean number of idea units increased from baseline to posttest phases for all students (see Table 3), a functional relation between the intervention and performance on the oral retell measure was not demonstrated.

Pilot Study 2: Experimental Design

Study 2 examined *Modules 1 (Identification)* & *2 (Note-Taking)* combined using a group experimental design with a small number of students with the following research questions:

1. Is it feasible for preservice teacher to deliver instruction for modules 1 & 2 with fidelity, and within a 25- to 30-minute time-frame for each lesson?
2. Do *Modules 1 & 2* of the *Structures Writing* intervention show promise of effectiveness for improving students' ability to:
    a. identify text structures used in expository text passages?
    b. take notes on information relevant to text structures?
    c. answer multiple-choice questions about informational text they read?

Method

Participants. Participants were 4th grade students recruited from a University-based reading clinic in the Plains region of the U.S. Prior to the start of the study, the primary investigator met with interested parents to discuss the study and obtain parental consent. In total,

there were 12 participants (seven girls, five boys). Six of the participants were receiving Special Education services. Based on pre-testing, the average standard score on the *Woodcock Reading Mastery Basic Skills* cluster was 80.5 (*range*, 59 to 103), and the average standard score on the Reading Comprehension cluster was 86 (*range*, 58 to 119). Of the 12 participants, eight were White, two were Asian, one was Black, and one did not report an ethnicity. Two participants were bilingual; of these, one did not speak English as their primary language. Three participants qualified for free-and-reduced lunch status. See Table 4 for demographics by treatment group. It should be noted that 83% of the students with identified disabilities in the sample ended up in the treatment group following random assignment of matched pairs.

Tutors. The tutors for the study consisted of seven undergraduate students enrolled in the teacher education program and one recent graduate in speech-language pathology who was working as a research assistant. All tutors received monetary compensation for their work.

The first and second author trained tutors to deliver the *Structures* program during two, one hour and 30-minute training sessions. The first session began with an overview of the purpose of the program, its materials, and the two types of lessons (i.e., teaching and practice). Next, the primary investigator discussed the purpose of *Module 1: Identification* "teaching" lessons and did a walk-through of the first lesson. The tutors then practiced lesson 1 with a peer partner. These previous 2 steps were repeated for the *Module 1: Identification* "practice" lessons. The second training session followed a similar format, except it focused on *Module 2*: *Note-Taking*. Students practiced *Module 2: Note-Taking* lessons 1, 4, 8, and 9 and a research assistant provided feedback.

The research team also held 30-minute, booster-training sessions in the days leading up to the start of instruction. The booster sessions served as a review for tutors delivering the

Structures program. Those in the comparison condition were taught how to teach the alternative instruction.

Measures. Measures used in this study included the *Woodcock Reading Mastery Test* (WRMT-III; Breaux, 2010), and two researcher-developed *Structures* assessments. We administered the WRMT-III at pretest only, and the *Structures* assessments at both pretest and posttest.

Woodcock Reading Mastery Test (WRMT). The WRMT is a norm-referenced test of reading achievement. We calculated the *Basic Skills* and *Reading Comprehension* cluster scores for all participants.

Basic skills cluster. The Basic Skills cluster score is made up of the Word Identification (WI) and Word Attack (WI) subtests. The WI subtest is intended to measure students' word-reading skills, whereas the WA subtest is meant to measure students' decoding skills. Administration of the WI involves prompting students to read individual English words. For the WA subtest, students read phonetically regular nonsense words. In both cases, the student attempts to read items of increasing difficulty until they read four consecutive items incorrectly. The Basic Skills cluster scores for the normed sample of fourth- and fifth-grade students have a high internal consistency with reliability coefficients of 0.96 and 0.95, respectively.

Reading comprehension cluster. The Reading Comprehension cluster is a combination of the Word Comprehension (WC) subtest and the Passage Comprehension (PC) subtest. The purpose of the WC subtest is to measure students' reading vocabulary knowledge, whereas the purpose of the PC subtest is to measure students reading comprehension skills. The WC subtests consists of three subsections: antonyms, synonyms, and analogies. Together, these three subsections necessitate students to recognize words, generate new words, and make associations

between words. For the PC subtest, students read cloze format sentences and paragraphs and must provide the missing word. As with Word Identification and Word Attack, the items on these subtests increase in difficulty and they are discontinued when the student answers four consecutive items incorrectly. The reliability coefficients for the normed sample of fourth- and fifth-grade are .94 and .95, indicating that the scores have a high internal consistency.

Structures reading assessments. These two researcher-developed assessments include the *Structures Identification* measure and the *Structures Comprehension* measure. The passages included in these measures were written by the research team and elementary school science and social studies teachers. There are two forms (A and B) for each measure.

Identification measure. The purpose of the Identification measure was to assess students' ability read passages and identify their text structure. It is comprised of 20, one-paragraph passages with each text structure (i.e., description, compare/contrast, sequence, problem/solution, and cause/effect) being represented four times. The passages are each 4 to 5 sentences in length and have Lexile scores ranging from 410 to 940. Test administrators direct the students to read the passages, one at a time, and choose the appropriate text structure from the five options presented. To score the measure, each item is marked as either 1 (correct) or 0 (incorrect) and the item scores are added together. Alternate form reliability of the measure was previously shown to be $r = 0.68$.

Reading comprehension measures. The *Structures Comprehension* measure was made up of two, 2-paragraph passages and two, 3-paragraph passages. Each paragraph represented a different text structure, and all five text structures are represented twice. For each passage, students were directed to "read and take notes." When the students completed reading and taking notes, they answered 2 multiple-choice questions about each paragraph of the passage (20

questions for the total assessment). Students were not allowed to look back at their notes while answering the questions. The questions are aimed at determining what students remember about information related to the structural elements of the passages. The multiple-choice questions are scored in the same way as the Identification measure (incorrect = 0, correct =1).

Students' notes were scored for number of idea units included in the notes related to the text structure (e.g., the "cause" in a cause/effect passage), using the procedures described in Study 1 in this manuscript. The number of notes were then converted to a percentage to control for passage length and elements in the passage.

Procedures. The study procedures included the following sequence of activities: 1) pre-assessments, 2) implementation of instruction, and 3) post-assessments.

Pre-Assessments. Beginning a week before instruction, research team members and tutors individually administered the four WRMT subtests to participants. Research assistants then assigned participants to either the treatment or the comparison group. Due to a small sample size, reading skill level between groups were balanced using a matched pairs procedure. The research assistants matched participants with similar scores on the *Reading Comprehension* cluster of the Woodcock Reading Mastery Test and randomly assigned one student from each pair into treatment or control. Next, they randomly assigned participants within each group to receive either form A or form B of the *Comprehension* and *Identification* measures. In all cases, the participants completed the Comprehension measure prior to the Identification measure

Implementation of Instruction. Instruction for both the treatment and comparison groups took place after school in a computer lab on a University campus. Often, multiple sessions took place in the lab at the same time. Eight participants met with tutors one-on-one; however, due to scheduling issues, four participants were taught in dyads. One dyad was in the

treatment condition and the other dyad was in the comparison condition. Instruction lasted for approximately four weeks (8 sessions). During this time, tutors met with participants two days a week for approximately one-hour for each session. Because the lessons in the *Structures* program were designed to be delivered in 25-30 minutes, the tutors delivered two lessons in one session, with a short break in-between. Students completed 15 lessons total.

Instructional Conditions. Participants in the treatment condition completed modules 1 & 2 of the *Structures* intervention. Participants in the comparison condition received instruction in narrative-based reading and writing strategies.

Treatment. The *Structures* program was comprised of two modules, which tutors taught in sequential order. The purpose of *Module 1: Identification* was to teach students how to identify the structure of expository texts. Unlike other text structure programs, this program did not emphasize signal words as a way to help students identify the text structure, because students may over-rely on signal words, leading them to miss important information in the text. Instead they were taught to try to understand the author's intent, and make a judgement based on the content presented. *Module 2: Note-Taking* was designed to teach students to take notes based on the structural components in expository texts in order to improve their comprehension. Program materials for each module consisted of PowerPoint presentations, teacher manuals, and student workbooks. There were two types of lessons: *teaching* and *practice*. The general framework for a teaching lesson included explanation/modeling, guided practice, and independent practice. In contrast, the practice lessons provided students with additional guided or independent practice opportunities. Detailed examples of *teaching* lessons from each module are provided in the next sections. For brief overviews of all the lessons within each module, refer to Table 5.

Tutors began *Module 1 lessons* by articulating the lesson goal to the participants, and giving an overview of expository text structure. In lesson 1, tutors discussed the definition of the Simple Description structure and introduced its icon, which served as a visual reminder of the definition. Tutors then read a Simple Description passage out loud and used a think-aloud process to model how they recognized its structure. They repeated these steps with the Compare/Contrast text structure. From there, the tutors read a new passage, used a think-aloud process to *model* discriminating between the Simple Description and Compare/Contrast structures, and then repeated this process with a second passage. Finally, the participants practiced discriminating between Simple Description and Compare/Contrast structures using passages in their workbooks. Tutors used their own judgment to decide whether students completed the four workbook passages as guided or independent practice. This process was repeated for other text structures in additional lessons, until students were making discriminations from among all five text structures.

In *Module 2* lessons, students learned to take notes using the text structure. After stating the lesson goal, the tutors reminded participants of three text structures (i.e., Simple Description, Compare/Contrast, and Sequence) they learned in module 1 and reviewed the definition and icon of Simple Description. The tutors then introduced the Simple Description note frame and discussed its features. Next, they read a Simple Description passage and used a think-aloud process to model how to use the frame to take notes on the text structure, topic, and information related to the text structure features. This step was repeated with a second passage. Finally, participants practiced taking notes on two passages in their workbooks. Tutors used their own judgment to determine how much support to provide during this part of the lesson. This instructional sequence was then repeated for the additional text structures, until student practiced

identifying the text structure of a passage on their own and taking notes using the appropriate frame.

Comparison group. Instruction for participants in the comparison group focused on narrative text and included both a reading comprehension and writing component. The reading comprehension component involved teaching participants how to make predictions about stories based on evidence (e.g., illustrations) and deciding whether the predictions were correct. For the writing component, participants wrote short stories based on picture prompts. They began by writing down story elements (e.g., setting, characters, etc.) and then creating their stories from this information.

Post-Assessments. At the end of the instructional sequence, participants completed the alternate form of the *Comprehension* and *Identification* measures that they had been given during pre-assessment.

Fidelity of Implementation. Fidelity forms were developed for both Modules 1 and 2 of the treatment. The forms included a checklist of the elements for each lesson. The fidelity observer made binary choices, indicating 1 if the element was observed, or 0 if it was not observed. Fidelity forms were also used to evaluate the control condition to determine if any treatment elements were present in the counterfactual.

Results

Two students from the control group did not complete the study, and the sample was too small for imputing missing data. Fidelity of implementation was relatively high, with 92.79 percent of the lesson elements implemented correctly across all lessons. However, there were some lessons that were more difficult for the instructors to implement, as indicated by the range of 46.67% to 100% of elements completed for individual lessons. However, lessons with low

fidelity were the exception, as the average percentage of elements included for each lesson ranged from 82.5% to 98.89%. The lesson with the lowest overall fidelity was lesson 10, which was also the lesson that had the single lowest fidelity of any lesson (46.67%). Without that individual lesson included, the average number of elements included for lesson 10 was 88.6%. The instructors completed more than 85% or more of all other lessons. Some individual tutors were more consistent than others, ranging from 79.96% to 98.3% of elements included across all of the lessons they implemented, with only one tutor falling below 86.4%. No elements of the treatment were observed in the control group lessons.

Table 6 shows the pretest and posttest means for each of the outcome measures. Bar graphs are provided to show pretest posttest comparisons within each group for each of the outcome measures (see Figures 8, 9, and 10). With only 12 total participants, this study was well underpowered. However, we conducted regression analyses to compare the groups on the three posttest outcome measures, controlling for pretest performance on each measure as a comparison.

The regression analysis indicated a statistically significant effect of treatment on the Structure Identification measure when controlling for the pretest measure ($B = 5.33$, $p = .032$). Students in the experimental condition scored, on average, 3.77 points higher than students in the control condition. Due to the small sample, we calculated the Hedge's g effect size using the gain score means and standard deviations; gain scores were used to account for any pre-existing differences between the students in the different conditions. The resulting effect size was $g = 1.43$ [95% CI = 0.18, 2.63].

There were no statistically significant effects in the regression models for the *Note-Taking* or *Reading Comprehension* outcomes. However, we calculated the non-significant effect

sizes to examine the whether the intervention shows promise of effects that should be explored in future studies with more power. The resulting effect size for *Note-Taking* measure was $g = 0.75$ [95% CI = -0.37, 1.84]. The resulting effect size for *Reading Comprehension* was $g = 0.50$ [95% CI = -0.59, 1.57].

Discussion

Both studies presented in this manuscript were pilot studies designed to examine the usability, feasibility, and promise of the of the *Structures Writing* intervention. In Study 1, the *note-taking* module was examined in isolation, while in Study 2, the *note-taking* instruction was preceded by lessons on the identification and discrimination of text structures when reading. As mentioned in the introduction, note-taking may be an important step for students writing informational text (or about informational text), as students may need to read source text, identify and record important information from the source text, and then incorporate those ideas into their own writing. Because informational text utilizes different text structures that narrative text, the purpose of the *Structures Note-taking* intervention was designed to teach students to take notes using the five text structures identified by Meyer (1975; 1985).

In both studies, undergraduate pre-service teachers were used as the instructors, and they were able to implement the intervention with fidelity. This provides some evidence of the usability and feasibility of the intervention for schools. However, this intervention needs to be tested specifically with school personnel before The instructors in both studies were able to deliver most of the intervention lessons within the 30-minute time-frame allotted for the intervention, making it feasible to fit within a school intervention period. However, some of the lessons may need to be revised by the researchers to streamline the instruction and help it fit into the timeframe a little more comfortably. The interventions for both studies were also delivered

outside of school settings in one-on-one or small groups, which may not be similar to school contexts.

Impacts on Note-Taking

In the multiple-probe design used for Study 1, the results of the note-taking intervention were mixed. A functional relation was demonstrated between the intervention and the note-taking measures across two students, but one student (Bob) did not take notes during one of his posttest probes. Despite this, Bob showed a change in level on his first two posttest probes, as well as in maintenance, indicating that he learned to take notes using the text structures. All of the students increased their average performance on baseline probes to their average performance on the posttest probes.

In addition to the mixed results of the visual analysis, the effects of the intervention seemed relatively weak. Students only took notes on a range of 0 to 13 idea units in the passages across all of the posttest and maintenance probes, and all of the students took notes on an average of less than 35% of the ideas related to the text structures on their posttest probes. However, Study 1 did not include instruction on identifying and discriminating among the text structures, which may have helped students take better notes.

In the experimental design for Study 2, no statistically significant differences were found between the two conditions for note-taking, due to lack of power. However, a non-significant effect size of 0.75 favored the treatment condition, as they took and average of more 17.23 more notes on idea units than the control group on average at the posttest, and an average of 16.64 more than their own pretest scores. These differences suggested that the treatment group students learned to take notes from the intervention.

Although neither study demonstrated the effectiveness of the note-taking intervention, taken together they demonstrate some promise for the intervention. The non-significant effect size for Study 2 was large and the results might be considered practically significant. Although there were not three replications of the effect in Study 1, it was primarily due to low performance of a single student on a single probe that occurred near a holiday.

Impacts on Reading Outcomes

The results of Study 2 showed a significant impact on the intervention on students' ability to identify and discriminate among text structures when reading. This is consistent with findings from a previous study (see Hebert, Bohaty, Nelson, and Lambert, 2018), and is remarkable considering the low power in the study. It also bears repeating that 83% of the students with identified learning disabilities were assigned to the treatment group. Students were matched on ability measures prior to assignment, and it is possible that students in the control group had learning disabilities that were not identified. However, the impacts of the intervention for the intervention group illustrate the promise of the effectiveness of this intervention for students with learning disabilities.

Neither study demonstrated an effect of the intervention on reading comprehension (oral retell in Study 1 and multiple-choice questions in Study 2). This is contrary to previous research examining demonstrating the effectiveness of note-taking on reading comprehension (see Graham & Hebert, 2011). The lack of results is not a complete surprise, as reading comprehension was a secondary and distal measure, and Hebert et al. (2018) also did not find impacts of the identification and discrimination lessons on reading comprehension outcomes. However, it should be noted that the non-significant effect size from Study 2 ($g = 0.50$) favored the treatment group; which was similar to Hebert et al. (2018), who also found a non-significant

effect size of 0.29 favoring the treatment group on a reading comprehension outcome. Study 1 also showed an increase in the average number of ideas recalled at posttest as compared to baseline for the three participants in the study. This is notable, especially considering the short duration of the intervention in both studies, and suggests that a longer, more rigorous, and fully-powered study of the intervention should be conducted to determine whether there are impacts on reading comprehension.

Limitations and Implications

Many of the limitations of the studies have already been highlighted throughout the discussion. However, examining shared limitations of both studies provides additional insight into the implications. Because both were pilot studies of the intervention with research questions aimed at usability, feasibility, and promise of the intervention, both studies examined a shortened version of the intervention. This may have led to smaller impacts, as students may have become more skilled at note-taking with more opportunities for modeled instruction and guided practice.

Second, neither study was conducted within a school setting. As such, aspects that may have impacted or been impacted by the context (e.g., transition times, space, and training/booster training/debriefing opportunities) could not be examined in terms of usability and feasibility. Future studies of the intervention need to be planned within a school context before the intervention should be adopted.

Third, and related to limitation two, two lessons were taught in a single day in many cases. This was primarily an artifact of the time constraints. However, it should be noted that this would not typically occur in a school setting and may have impacted the results in a variety of ways. Students receiving more distributed practice over time may internalize the instruction, leading to larger effects. On the other hand, the study may have resulted in larger effects than

might be expected due to the intensive nature of the instruction, meaning that smaller effects might be expected in school settings. More research needs to be done to examine the effects of this intervention in school settings.

Fourth, neither pilot study included the information writing lessons of the intervention. The *Structures Writing* intervention is being developed to improve the informational writing skills of students with and at-risk for learning disabilities. The note-taking lessons are important to helping students conduct research and prepare to write their own informational text, but these studies did not examine whether these lessons provide a solid foundation for learning those writing skills. The writing lessons have been examined in a separate study demonstrating the effectiveness of that component of the intervention (see Hebert, Bohaty, Nelson, & Roehling, 2018). Future studies need to be conducted to pair the writing and note-taking lessons for a full test of the intervention.

Potential Changes to the Intervention

These pilot studies provided useful information about the usability and feasibility of this intervention, as well as the promise of the intervention for improving outcomes for students with learning disabilities. Based on the information, some important changes to the intervention are being considered that may improve their usability and effectiveness for students with learning disabilities. First, the lessons fit fairly well into the instructional timeframe of 25-30 minutes, but some improvements might be made, especially for the earlier lessons in each module. Based on our fidelity data, difficulties with the implementation of earlier lessons indicate that both teachers and students may need to gain familiarity with the instruction and activities to be able to complete them within the allotted time frame. One possibility is to reduce the number of

activities within the early lessons, and spend more time introducing and modeling the critical initial concepts and activities, respectively.

Neither study led to increases in reading comprehension. Although we suggested one reason for this may be that the full intervention had not been implemented, it is also possible that we need to build-in instructional components that make the connections between the instruction and informational reading activities more explicit, or to show the students how to apply what they learn to their reading. We might consider developing lessons to explicitly show these connections, or building such activities into lessons. For the identification and discrimination module, we might build in more explicit activities linking the identification of the passage to answering specific questions about the passage. For the note-taking module, changes may include helping students anticipate questions they may see on a test based on their notes, or to restate how the structure helped the author organize the ideas after taking notes.

Conclusion

The two pilot studies of the *Structure Writing* intervention note-taking lessons demonstrate some evidence of usability, feasibility, and promise. The intervention can be implemented with fidelity and, taken together, the studies seem to show that students can improve their skills in taking notes on informational text related to text structures when using this approach. More instructional lessons, with a focus on providing more opportunities for guided practice, may lead to stronger evidence of effectiveness for improving students' note-taking skills. Revisions to the intervention will provide more emphasis on providing modeling and guided practice opportunities in the context of preparing for to write original informational text to provide a more authentic motivator for taking good notes. There are also reasons to be

optimistic about the potential for the intervention to have impacts on reading outcomes when the full-intervention is implemented.

References

Anderson, R. C., & Nagy, W. E. (1991). Word meanings. Hillsdale, NJ: Lawrence Erlbaum.

Berninger, V. W., & Amtmann, D. (2003). Preventing written expression disabilities through early and continuing assessment and intervention for handwriting and/or spelling problems: Research into practice. In H. L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 345-363). New York: Guilford Press.

Bigelow, M. L. (1992). The effects of information processing strategies and cognitive style on achievement of selected educational outcomes. Unpublished dissertation, Pennsylvania State University

Breaux, K. C. (2010). Wechsler Individual Achievement Test – third edition: Technical manual. Bloomington, MN: Pearson.

Chang, K. E., Chen, I., and Sung, Y. T. (2002). The effect of concept mapping to enhance text comprehension and summarization. *Journal of Experimental Education, 71*, 5–23. doi: 10.1080/00220970209602054

Duke, N.K., & Pearson, P.D. (2002). Effective practices for developing reading comprehension. In A.E. Farstrup & S.J. Samuels (Eds.), *What research has to say about reading instruction* (3rd ed., pp. 205–242). Newark, DE: International Reading Association.

Englert, C. S., & Hiebert, E. H. (1984). Children's developing awareness of text structures in expository materials. *Journal of Educational Psychology, 76*, 65-75. doi: 10.1037/0022-0663.76.1.65

Faber, J. E., Morris, J. D., and Lieberman, M. G. (2000). The effect of note taking on ninth grade students' comprehension. *Reading Psychology, 21*, 257–270. doi:10.1080/02702710050144377

Flower, L., & Hayes, J. R. (1981). Plans that guide the composing process. *Writing: the nature, development, and teaching of written communication, 2,* 39-58.

Graham, S. (2018). A writer(s) within community model of writing. In C. Bazerman, V. Berninger, D. Brandt, S. Graham, J. Langer, S. Murphy, P. Matsuda, D. Rowe, & M. Schleppegrell,(Eds.), *The lifespan development of writing* (pp. 271-325). Urbana, IL: National Council of English.

Graham, S., & Hebert, M. (2011). Writing-to-read: A meta-analysis of the impact of writing and writing instruction on reading. *Harvard Educational Review, 81,* 710-744. doi:10.17763/haer.81.4.t2k0m13756113566

Hammann, L. A., & Stevens, R. J. (2003). Instructional approaches to improving students' writing of compare-contrast essays: An experimental study. *Journal of Literacy Research, 35,* 731-756. doi:10.1207/s15548430jlr3502_3

Hayes, J. (1996). A new framework for understanding cognition and affect in writing. In M. Levy & S. Ransdell (Eds.), *The science of writing: Theories, methods, individual differences, and applications* (pp. 1-27). Mahwah, NJ: Erbaum.

Hebert, M. (in press). Writing from Source Material. In S. Graham, C. MacArthur, and M. Hebert (Eds.), Best practices in writing instruction, third edition (pages TBD). NY: Guilford.

Hebert, M., Bohaty, J. J., Nelson, J. R., & Brown, J. A. (2016). The effects of text structure instruction on expository reading comprehension: A meta-analysis. *Journal of Educational Psychology, 108,* 609-629. doi:10.1037/edu0000082

Hebert, M., Bohaty, J. J., Nelson, J. R., & Lambert, M. C. (2018). Identifying and discriminating expository text structures: An experiment with 4th and 5th grade

struggling readers *Reading and Writing: An Interdisciplinary Journal*. doi: 10.1007/s11145-018-9826-9

Hebert, M. Bohaty, J. J. Nelson, J. R., & Roehling, J. V. (2018). Writing informational text using provided information and text structures: An intervention for upper elementary struggling writers. *Reading and Writing: An Interdisciplinary Journal*. doi:10.1007/s11145-018-9841-x

Hebert, M., Kearns, D. M., Hayes, J. B., Bazis, P., & Cooper, S. (under review). Why Children with Dyslexia Struggle with Writing and How to Help them. *Language, Speech, and Hearing Services in Schools*.

McGee, L. M. (1982). Awareness of text structure: Effects on children's recall of expository text. *Reading Research Quarterly, 17,* 581-590. doi: 10.2307/747572

Meyer, B. J. F. (1975). The organization of prose and its effects on memory. Amsterdam, Netherlands: North-Holland Publishing.

Meyer, B. J. F. (1985). Prose analysis: Purposes, procedures, and problems. In B. K. Britton & J. Black (Eds.), Understanding expository text: A theoretical and practical handbook for analyzing explanatory text (pp. 269-304). Hillsdale, NJ: Erlbaum.

Meyer, B. J. F., Brandt, D. M., & Bluth, G. J. (1980). Use of top-level structure in text: Key for reading comprehension of ninth-grade students. *Reading Research Quarterly, 16,* 72-103. doi:10.2307/747349

Ray, M. N., & Meyer, B. J. (2011). Individual differences in children's knowledge of expository text structures: A review of literature. *International Electronic Journal of Elementary Education*, *4*(1), 67-82.

Snow, C. (2002). *Reading for understanding: Toward an R & D program in reading comprehension*. Santa Monica, CA: Rand Corporation.

Taylor, B. M. (1980). Children's memory for expository text after reading. *Reading Research Quarterly, 15*, 399-411. doi:10.2307/747422

Williams, J. P., & Pao, L. S. (2011). Teaching narrative and expository text structure to improve comprehension. In R. E. O'connor & P. F. Vadasy (Eds.), *Handbook of Reading Interventions* (pp. 254-278). New York: The Guilford Press.

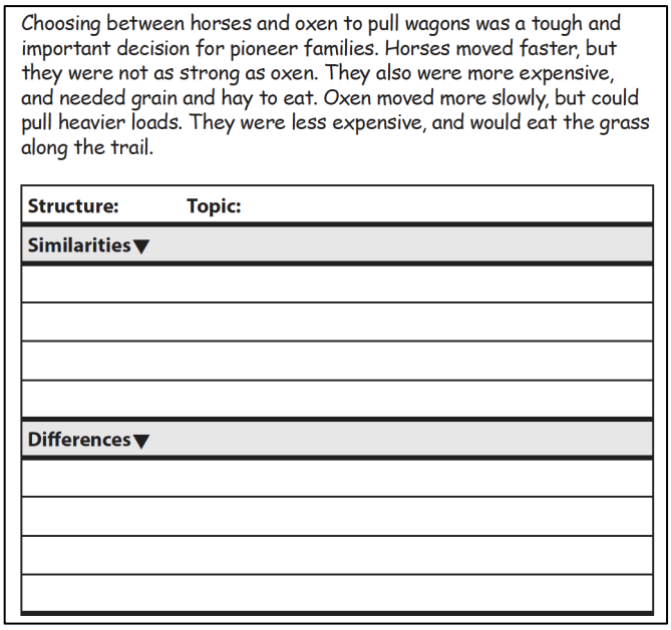

Figure 1. Example Information Frame

Properties of Matter

Idea Units:

Paragraph 1 (Simple Description):
___Matter is anything that has mass
___Matter is anything that takes up space
___Matter includes all living things
___Matter includes all nonliving things
___Every piece of matter has its own physical properties that can be observed
___Color is a physical property
___Volume is a physical property
___Mass is a physical property
___Temperature is a physical property
___Texture is a physical property

Paragraph 2 (Compare/Contrast):
___Water is one type of matter
___Water can be a solid
___Water can be a liquid
___Water can be a gas
___If water freezes, it turns to ice
___Ice is a solid
___Ice has defined shape
___Ice has defined volume
___If water is a liquid, it takes the shape of its container
___It has defined volume
___It does not have defined shape
___If water evaporates, it turns into water vapor
___Water vapor does not have defined volume
___Water vapor does not have define shape
___These different forms of water are called states of matter

Paragraph 3 (Sequence):
___You often see water cycle through the states of matter from ice to gas
___Ice is a solid state of matter
___When ice warms up, the particles that make up the ice spread apart
___The ice melts into a liquid state
___As the water warms up more, the particles spread apart even more
___The particles leave the surface of the water and turn into vapor
___The water is now in a gas state

Total facts: ____

Figure 2. Idea Units Score Sheet used to score notes and oral retells

Reading Passge

How a Bill Becomes a Law

Congress is part of the federal government. Congress is made up of the House of Representatives and the Senate. They meet in the Capitol building in Washington, D.C. Congress declares war, confirms appointments for the President, and makes budgets. Congress also makes laws.

Laws can be initiated in the House of Representatives or Senate. For a law to be initiated in the House, a representative must present an idea to other members. If they agree with the idea, it is introduced as a bill within the House. The bill is given to a committee to review and revise. The members of the House vote on the final bill. The Senate also debates and votes on the bill. When the Senate and House of Representatives agree on the bill, it is taken to the President to sign as a new law.

Both the House of Representatives and Senate have rules that help them pass laws. They have the authority to make their own rules. The rules of the House allow for quick passage of laws. In contrast, the Senate rules promote deliberation rather than quick action. Both the House and Senate use committees to make the process more efficient.

Rubric for scoring notes for text structure elements

How a Bill Becomes a Law

Paragraph 1: Simple Description

Points	
/1	**Topic**: Congress
	Characteristics/Facts:
/1	Part of federal government
/1	Made up of House and Senate
/1	Meet in the Capitol building OR in Washington, D.C.
/1	Jobs: Declares war, OR Confirms appointments OR Makes budgets OR Makes laws
	Notes:

Paragraph 2: Sequence

Points		
/2	**Topic**: New law	**Type**: Steps
	Events:	
/1	1. Representative presents idea	
/1	2. Idea is introduced as a bill	
/1	3. Bill is given to a committee	
/1	4. Members vote	
/1	5. Senate debates AND/OR votes	
/1	6. President to signs	
	Notes:	

Paragraph 3: Compare/Contrast

Points	
/2	**Topic**: House of Representatives vs. Senate
	Similarities:
/1	Both have rules to pass laws
/1	Have authority to make their own rules
/1	Both use committees
/1	
/1	**Differences**:
/1	Time it takes to pass laws: OR House (quick) vs. Senate (long, deliberate)
	Notes:

____/ 18 Total Points

____%

Figure 3. Example rubric for scoring text structure notes alongside the corresponding reading passage.

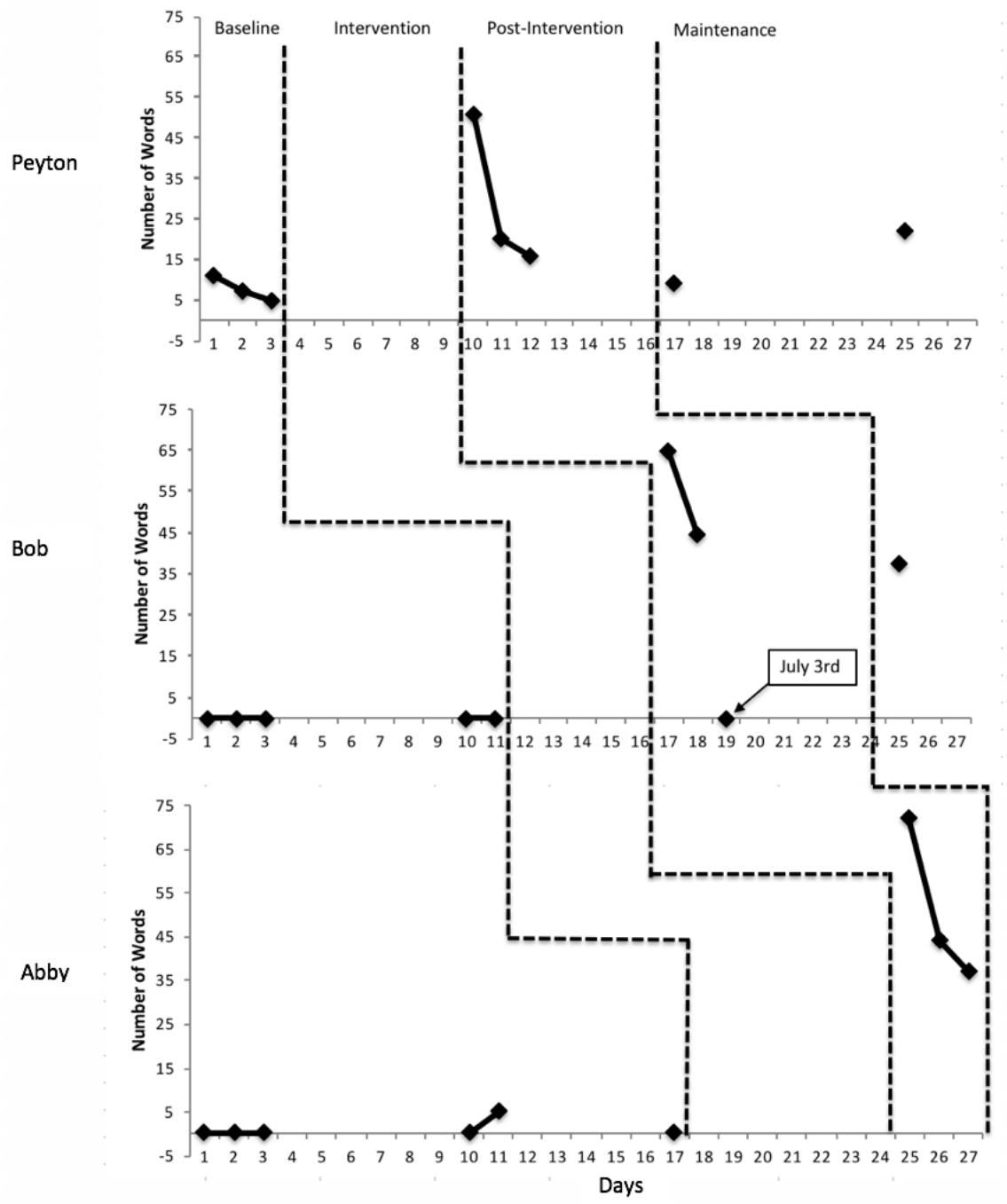

Figure 4. *Number of Words Written in Notes*

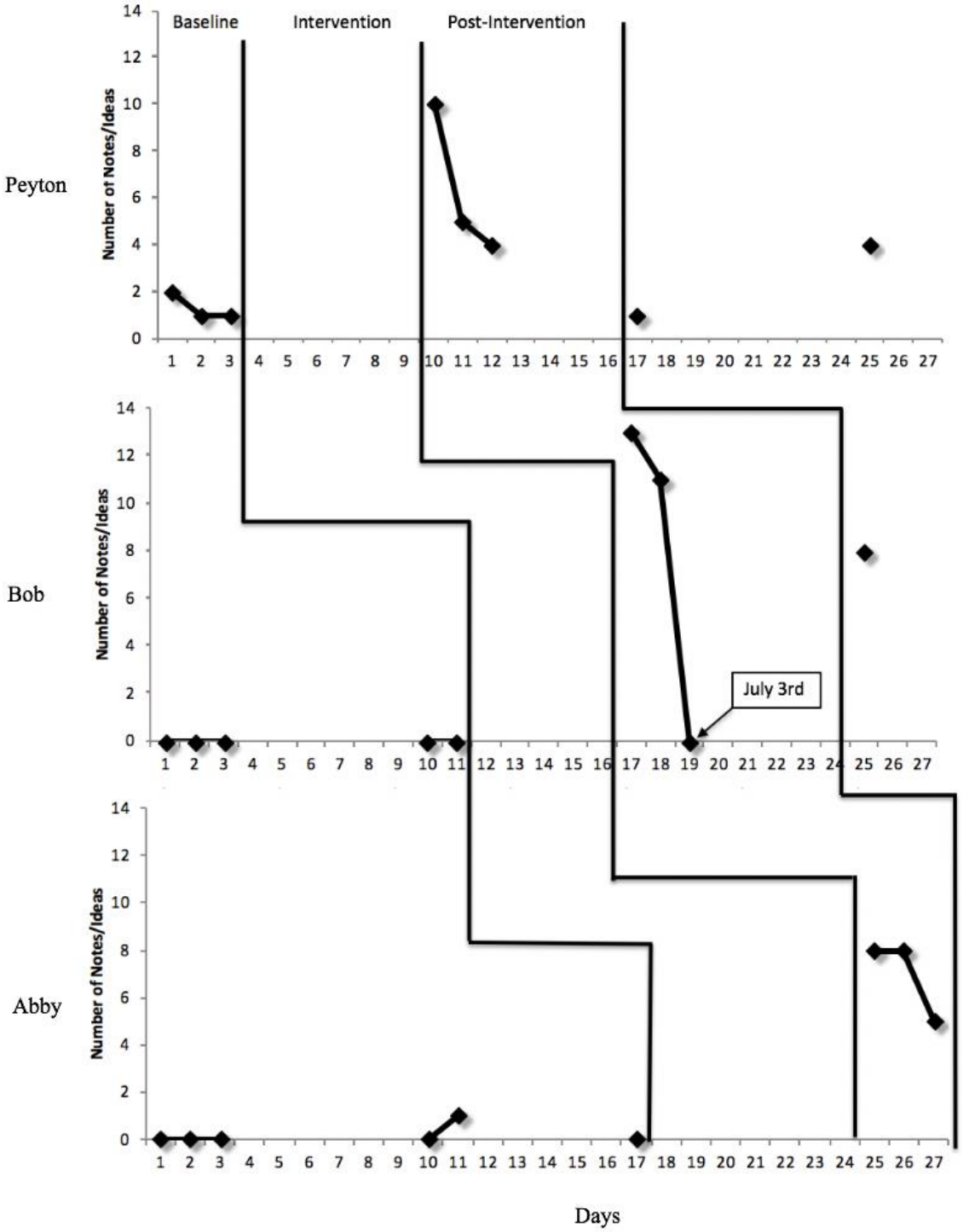

Figure 5. Number of Idea Units Represented in Students' Notes

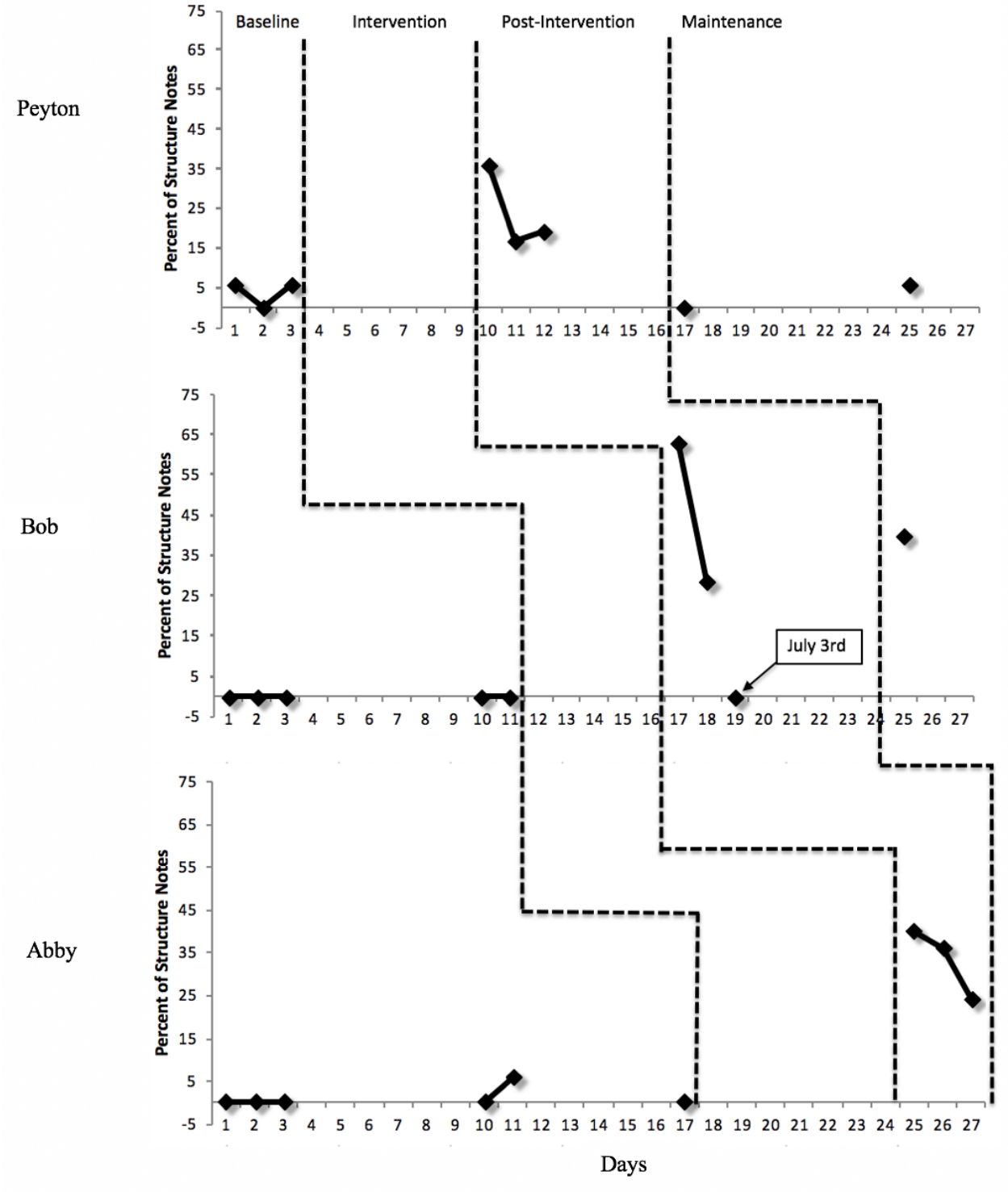

Figure 6. Percentage of the Structure Ideas from the Reading Passage Represented in Students Notes

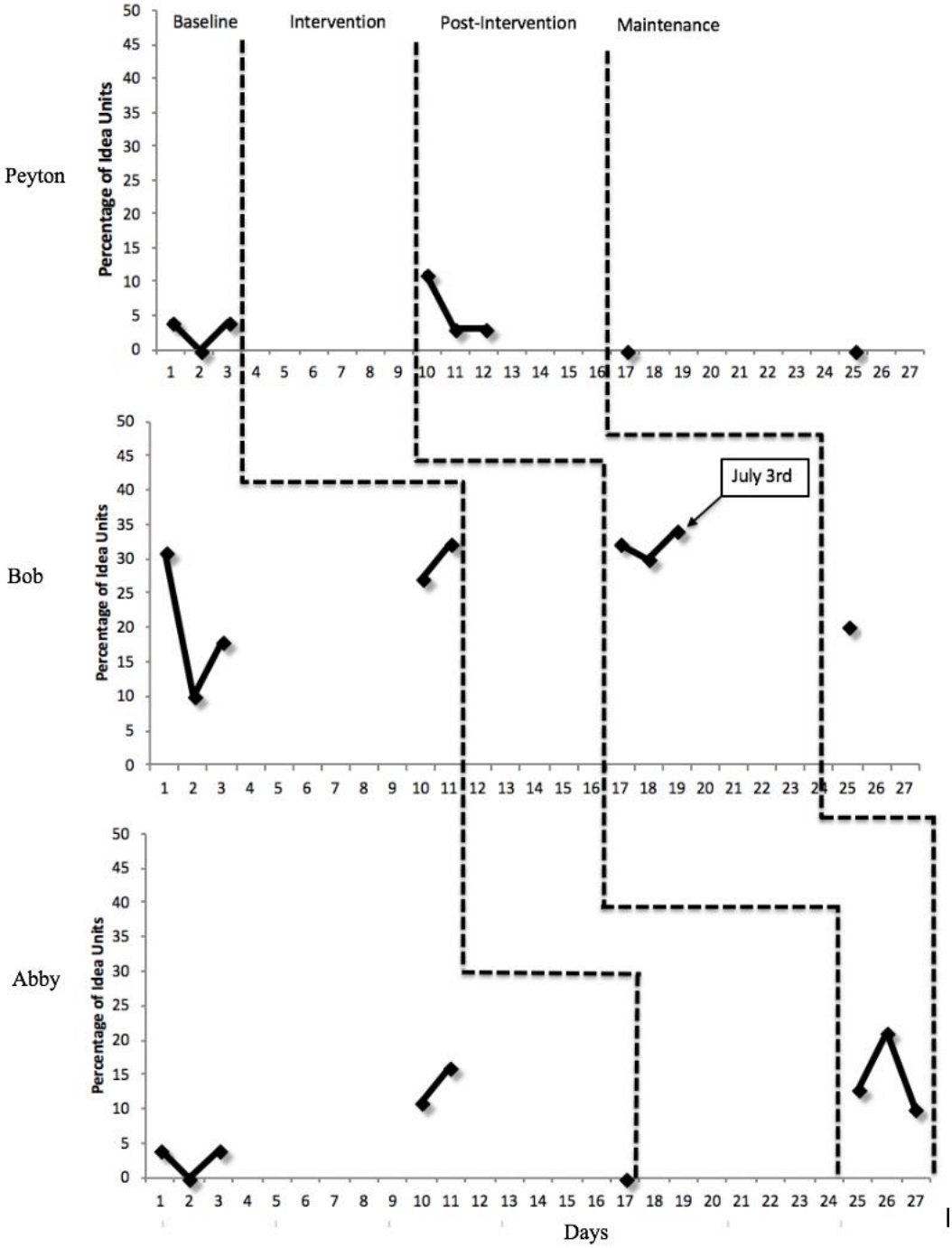

Figure 7. Number of Idea Units from the Reading Passage in Students' Oral Retell

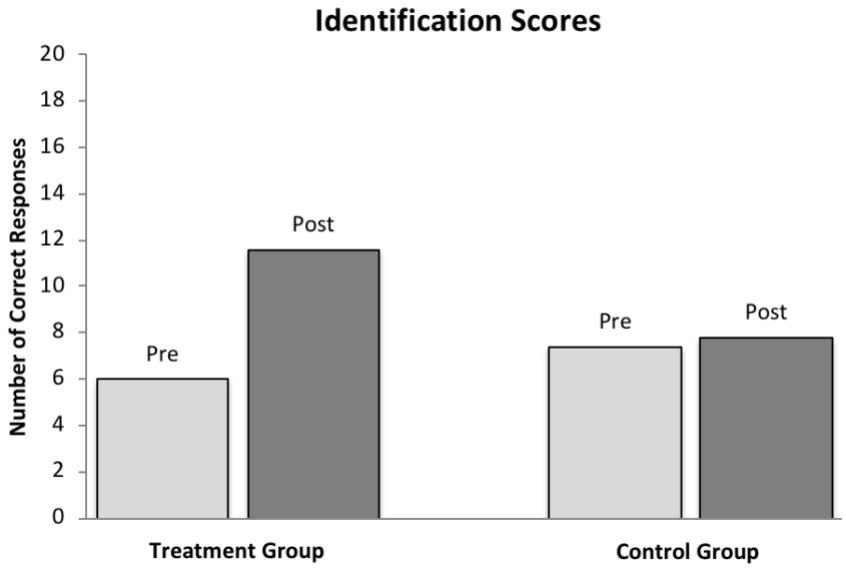

Figure 8. Comparing Mean Scores on the Structures Identification Measure

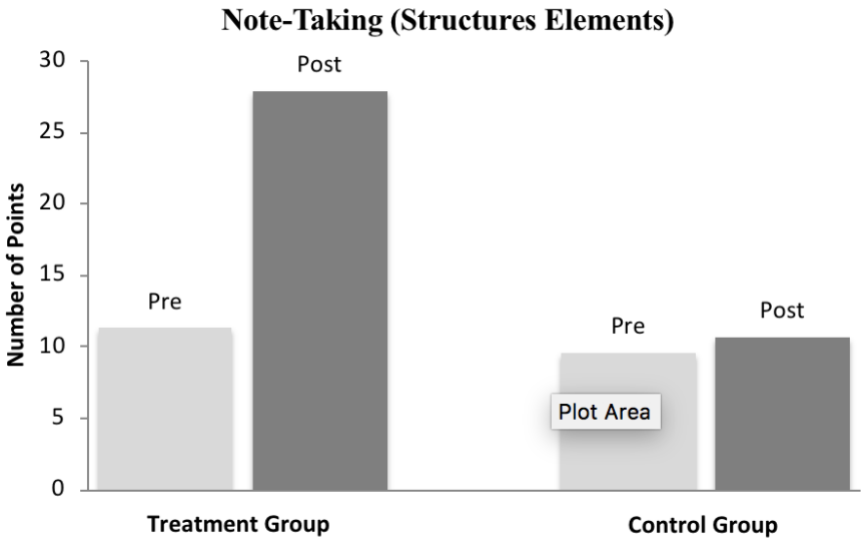

Figure 9. Comparing Mean Scores on the Note-Taking Measure

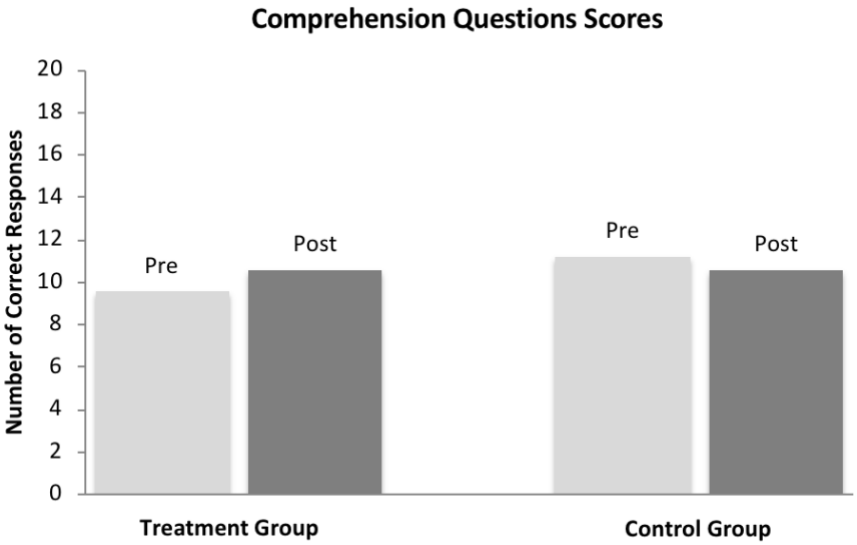

Figure 10. Comparing Mean Scores on the Comprehension Measure

Table 1

Fidelity of Implementation by Lesson

	Percentage of Lesson Elements Taught						
Student	L1	L2	L3	L4	L5	L6	L7
Peyton	77	82	80	100	100	86	100
Bob	89	82	79	84	100	100	100
Abby	92	95	91	84	100	100	91

Table 2

Mean Note Taking Scores for Each Participant across Conditions

	Participants		
	Peyton	Bob	Abby
Number of Words			
Baseline	7.7	0.0	0.8
Post-Instruction	17.0	36.7	51.0
Maintenance	15.5	38	—
Number of Idea Units			
Baseline	1.3	0.0	0.2
Post-Instruction	4.7	7.3	8
Maintenance	3.5	10	—
Structure Elements			
Baseline	4.0%	0.0%	0.1%
Post-Instruction	24.0%	30.7%	33.3%
Maintenance	3%	40%	—

Table 3

Average Oral Retell Scores for Each Participant across Conditions

	Participants		
	Peyton	Bob	Abby
Oral Retell			
Baseline	1.3	23.6	5.8
Post-Instruction	4.6	29.0	14.7
Maintenance	0.0	20.0	-

Table 4

Demographic Characteristics of Student Participants by Treatment Group

	Experimental (n = 7)	Control (n = 5)
Gender		
Female	4 (57%)	1 (20%)
Male	3 (43%)	4 (80%)
Ethnicity		
African American	2 (29%)	0
Asian	0	1 (20%)
Caucasian	4 (57%)	4 (80%)
Unknown	1 (14%)	0
Free-Reduced Lunch	2 (29%)	1 (20%)
IEP's	5 (71%)	1 (20%)
WRMT-R Basic Skills		
Mean	79.86	81.40
(SD)	(15.67)	(12.91)
WRMT-R Reading Comprehension		
Mean	86.57	85.80
(SD)	(17.27)	(18.83)

Table 5

Overview of Lessons for Modules 1 & 2

	Module 1 Lessons
Lesson	Description
1	Students learn to discriminate between SD and CC.
2	Students learn to discriminate among SD, CC and SQ.
3	Students practice discriminating among SD, CC and SQ.
4	Students learn to discriminate between CE and PS.
5	Students practice discriminating between CE and PS.
6	Students practice discriminating among all five text structures.
	Module 2 Lessons
1	Students learn to take notes on SD texts using note frames.
2	Students learn to take notes on SQ texts using note frames.
3	Students learn to take notes on CC texts using note frames.
4	Students practice taking notes on SD, SQ, and CC texts using note frames.
5	Students learn to take notes on PS texts using note frames.
6	Students learn to take notes on CE texts using note frames.
7	Students practice taking notes on PS and CE texts using note frames.
8	Students learn to take notes on texts without using note frames.
9	Students learn o take notes on multiple texts without using note frames.

Note: SD = Simple Description, CC = Compare/Contrast, SQ = Sequence, PS = Problem/Solution, CE = Cause/Effect

Table 6

Mean Scores on Outcome Measures

Measures	Treatment (n = 7)	Control (n = 5)
	M (SD)	M (SD)
Structure Identification		
Pretest	6.00 (2.00)	7.40 (4.15)
Posttest	11.57 (5.12)	7.80 (4.15)
Structures Notes		
Pretest	11.29 (9.34)	9.60 (8.88)
Posttest	27.93 (22.60)	10.70 (2.18)
Structures Comprehension		
Pretest	9.57 (3.69)	11.20 (3.96)
Posttest	10.57 (4.57)	10.60 (5.37)